
CHAPTER 1

SUMMARY

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This section provides a summary of the Final Environmental Impact Statement for the Mats Mats Quarry. It briefly describes the proposal and alternatives, and lists anticipated impacts, mitigation measures and significant unavoidable adverse impacts. A matrix in this chapter provides a comparative overview of impacts identified for the proposal and alternatives.

1.1 SUMMARY OF THE PROPOSED ACTION

The proposal is an update of the existing Department of Natural Resources (DNR) Surface Mining Reclamation Permit (#70-010170) for the Mats Mats Quarry Operation. The update to the permit is required to; 1) transfer the permit from Fletcher General (also known as General Construction) to Glacier Northwest; 2) meet the standards of Washington's Surface Mining Act, as amended in 1993; and, 3) reflect the continuation of hard rock mining to an increased depth of 60 feet below mean lower-low water level (MLLW) and related importation of clean soil by barge for reclamation. The operator will continue current mining and barge transportation activities until approximately 2025. No increase in mining *rate* is proposed; the rate of extraction would fluctuate with market conditions, as it has historically. The rate of mining is currently limited by the amount of mined material that can be stored on site, the rate at which barges can be loaded at the facility and the limit on hours of operation. None of these factors would change as a result of the *Proposed Action* or the alternatives. As currently permitted, mining would include two primary components: 1) Mining Operation; and, 2) Reclamation.

1.2 SUMMARY OF ALTERNATIVES

Two alternatives to the *Proposed Action* are analyzed in this Environmental Impact Statement (EIS). Alternative 1, *No Action*, would entail transfer of the reclamation permit and continued mining until reserves to a depth of 0 MLLW are depleted. Under current market conditions, mining activities would continue until approximately 2005, with reclamation complete in approximately 2007.

Under Alternative 2, *Limited Mining Alternative* the transfer and update of the reclamation permit would occur as under the Proposal. However, this alternative would entail an increased mining depth of 30 feet below MLLW compared to 60 feet under the Proposal. Under current market conditions, mining activities would continue until approximately 2013, with reclamation complete in approximately 2015.

1.3 Environmental Impacts

The following table summarizes the potential significant impacts identified in this environmental analysis. Impacts associated with the two alternatives are discussed relative to those associated with the *Proposed Action*. This summary is not intended to be a substitute for the complete discussion of each element that is contained in *Section 3.0*.

ELEMENT	Proposed Action	No Action Alternative	Limited Mining Alternative
<u>Earth</u>	<ul style="list-style-type: none"> The existing surface topography of the site would continue to be modified as rock resources are extracted. The existing quarry floor, with a lowest elevation of approximately 13 feet below MLLW, would be deepened to approximately 60 feet below MLLW. Salt-water seepage into the quarry could increase – although significant impacts would not be anticipated. Because the rock is hard, massive, and competent, potential for instability is minor. The calculated stability of the highwall between salt-water and the quarry interior would exceed the standards for both non-seismic and seismic conditions with no significant risk of highwall failure anticipated. Approximately 7.3 million cubic yards of material would be required to establish a final floor elevation ranging from approximately 20 to 30 feet above MLLW. With the proposed mitigation measures, significant erosion impacts associated with mining and reclamation would not be anticipated. 	<ul style="list-style-type: none"> Mining conditions under the existing surface mining and reclamation permits would continue. Mining would occur to a depth of approximately 0 feet below MLLW. Mining operations and resultant earth impacts would end approximately 18 years earlier than under the <i>Proposed Action</i>. The amount of soil required for reclamation would be less than under the <i>Proposed Action</i> 	<ul style="list-style-type: none"> The level of site modification would be less than under the <i>Proposed Action</i>, although the mining footprint would be the same. Mining would occur to a depth of approximately 30 feet below MLLW. The amount of material mined from the site would increase, although at a lower level than under the <i>Proposed Action</i>. Salt-water seepage into the quarry could increase – as under the <i>Proposed Action</i>, significant impacts would not be anticipated. Mining operations and resultant earth impacts would end approximately 10 years earlier than under the <i>Proposed Action</i>. The amount of soil required for reclamation would be less than under the <i>Proposed Action</i>.
<u>Air Quality</u>	<ul style="list-style-type: none"> The <i>Proposed Action</i> would continue to generate fugitive dust and particulate matter from emission sources like loading operations and unpaved roads. The magnitude of fugitive dust impacts from mining would generally remain constant; however, the 	<ul style="list-style-type: none"> The Mats Mats Quarry would continue to operate under the current permit, with resultant continuation of generation of fugitive dust and vehicle emissions. 	<ul style="list-style-type: none"> Air quality conditions would be similar to those under the <i>Proposed Action</i>, but would end approximately 10 years earlier. The amount of fugitive dust

ELEMENT	Proposed Action	No Action Alternative	Limited Mining Alternative
	<p><i>Proposed Action</i> would prolong the life of the mining operation with generation of dust from mining and reclamation activities continuing until approximately 2025 compared to approximately 2007 without the <i>Proposed Action</i>.</p> <ul style="list-style-type: none"> Quarry reclamation with soil would generate additional fugitive dust as a result of the soil movement. Peak deposition of dust to Mats Mats Bay from mining activities would be less than one centimeter after 100 years (maximum of 18 years proposed) and would not result in significant impacts. 	<ul style="list-style-type: none"> Air quality conditions would be similar to current conditions. The amount of fugitive dust associated with reclamation would be less than under the <i>Proposed Action</i>. Deposition of dust to Mats Mats Bay would be less than under the <i>Proposed Action</i>. 	<p>associated with reclamation would be more than under the No Action Alternative and less than under the <i>Proposed Action</i>.</p> <ul style="list-style-type: none"> Deposition of dust to Mats Mats Bay would be more than under the No Action Alternative and less than under the <i>Proposed Action</i>.
<u>Surface Water</u>	<ul style="list-style-type: none"> All stormwater runoff from the developed portions of the site would continue to be directed to the existing stormwater treatment and discharge system. Continued blasting would generate dust and fines, and rock processing would generate fine sediments that could combine to create a risk of sediment movement and transport to Mats Mats Bay. Continued quarry operations would continue the potential for water quality impacts related to pH, phosphorus and nitrogen, temperature, and oil and grease. With the proposed stormwater quality system and identified mitigation measures, significant water quality impacts would not be anticipated. 	<ul style="list-style-type: none"> Current stormwater conditions on the site would continue. Stormwater quality conditions would be similar to those under the <i>Proposed Action</i>, but would occur over a shorter period of time. 	<ul style="list-style-type: none"> Stormwater runoff would be directed to a stormwater system similar to that described for the <i>Proposed Action</i>. Stormwater conditions under mining would be similar to those under the <i>Proposed Action</i>, but would end approximately 10 years earlier. As under the <i>Proposed Action</i>, no significant impacts to surface water or groundwater resources would be anticipated.
<u>Groundwater</u>	<ul style="list-style-type: none"> Groundwater impacts limited to the quarry site include: <ul style="list-style-type: none"> increase in marine seepage into exposed mine area below sea level; marine seepage could result in small amounts of brackish water during mining; some temporary changes to freshwater/saltwater interface beneath quarry prior to reclamation; and, 	<ul style="list-style-type: none"> Although not identified as a significant impact under the <i>Proposed Action</i>, the potential for marine seepage into the quarry would be less than under the <i>Proposed Action</i>. 	<ul style="list-style-type: none"> Although not identified as a significant impact under the <i>Proposed Action</i>, the potential for marine seepage into the quarry would be less than under the <i>Proposed Action</i>.

ELEMENT	Proposed Action	No Action Alternative	Limited Mining Alternative
	<ul style="list-style-type: none"> - accumulation of freshwater in reclamation backfill resulting in decreased elevations for freshwater/saltwater interface after reclamation is complete. • Low risk of impacts to off-site domestic supply wells resulting from mining operations exposing undocumented water-bearing fractures or faults that provide primary source of water to domestic wells. • Fresh groundwater accumulation in reclamation backfill could provide small positive condition for long-term sustainability of groundwater supply sources for nearby domestic wells. • Continuation of mining activities would not be anticipated to impact the quantity or quality of groundwater in existing off-site wells. 		
<u>Plants & Animals</u>	<ul style="list-style-type: none"> • Continuation of mining would be contained within the existing quarry footprint and no clearing of vegetated area would occur. • Phased reclamation would result in new animal habitat on the site. • The primary marine habitat impact concerns associated with barge activities include: dredging of spilled material; petroleum spills from marine equipment activity; habitat degradation from barge and ramp facility shading; and, impacts to water quality from mining and barge traffic activities. 	<ul style="list-style-type: none"> • As under the <i>Proposed Action</i>, no clearing of additional vegetated area would occur. • Wildlife conditions after reclamation would be similar to the <i>Proposed Action</i>, but would be implemented earlier. • Marine habitats impacts would be similar to those described under the <i>Proposed Action</i>, but continue until approximately 2007 compared to 2025 under the <i>Proposed Action</i>. 	<ul style="list-style-type: none"> • As under the <i>Proposed Action</i>, no clearing of additional vegetated area would occur. • Wildlife conditions after reclamation would be similar to the <i>Proposed Action</i>, but would be implemented by approximately 2015 compared to 2025 under the <i>Proposed Action</i>. • The potential for marine habitat impacts would be similar to those under the <i>Proposed Action</i>, but would occur for a shorter period of time.
<u>Noise</u>	<ul style="list-style-type: none"> • Noise generation with continued mining would be comparable to or less than current conditions. • With the <i>Proposed Action</i>, noise generation from quarry could be reduced from existing conditions due to: placing the 42" crusher behind topographic barrier; locating rock drill and shovel deeper into the quarry; relocating crushing activities to the center of 	<ul style="list-style-type: none"> • Operational noise would remain unchanged from current conditions. • Quarry noise would end sooner than under the <i>Proposed Action</i> or Limited Mining Alternative. 	<ul style="list-style-type: none"> • Operational noise would be similar to that under the <i>Proposed Action</i>. • Quarry noise would end sooner than under the <i>Proposed Action</i> and later than under the No Action Alternative.

ELEMENT	Proposed Action	No Action Alternative	Limited Mining Alternative
	<p>the site; and limiting the hours of operation.</p> <ul style="list-style-type: none"> Although maximum sound levels would not be anticipated to increase, average sound levels from the quarry could increase slightly due to increased activity during reclamation 		
<u>Risk of Explosion</u>	<ul style="list-style-type: none"> Blasting of rock for mining would continue as under existing conditions. With proper adherence to the proposed blasting standards, no impacts to any structures or area wells would be anticipated from ground vibrations resulting from blasting. With the proposed blasting standards, no significant impacts resulting from fly rock would be anticipated. 	<ul style="list-style-type: none"> Vibration and flyrock conditions would be similar to those under the <i>Proposed Action</i>. Blasting related to mining activities would end sooner than under the <i>Proposed Action</i>. 	<ul style="list-style-type: none"> Vibration and flyrock conditions would be similar to those under the <i>Proposed Action</i>. Blasting related to mining activities would end sooner than under the <i>Proposed Action</i> and later than under the No Action Alternative.
<u>Land Use Patterns</u>	<ul style="list-style-type: none"> The continuation of mining would not change the existing land use character of the site and would not change the rural character of the area. Continuation of the existing mining operation would affect several different elements of the environment, including air quality, noise, and traffic, which could indirectly affect land uses in the vicinity of the site. These conditions would continue until approximately 2025 compared to approximately 2005 Uses of the type and scale proposed do not typically generate spin off uses; continued mining would not be expected, for example, to create a significant demand for commercial or residential uses to support employees or mining operations. Because views to the quarry floor are generally blocked by the perimeter berms and the extent of the mining area would not significantly increase, view impacts resulting from proposed mining would not be significant. 	<ul style="list-style-type: none"> Land use impacts related to mining would be similar to those under the <i>Proposed Action</i>, although land use impacts would end approximately 18 years earlier. 	<ul style="list-style-type: none"> Land use impacts related to mining would be similar to those under the <i>Proposed Action</i>, although land use impacts would end approximately 10 years earlier.
<u>Transportation</u>			

ELEMENT	Proposed Action	No Action Alternative	Limited Mining Alternative
	<ul style="list-style-type: none"> • The proposal would not result in new truck or employee traffic to area roadways. • The annual traffic growth (background growth) would be the primary change to vehicular traffic in the area. • Background growth would not result in any change in intersection level of service. • As under current conditions, barges would continue to be loaded/unloaded at the eastern edge of the site. • As under existing conditions, the <u>annual</u> number of barge trips would vary depending on the amount of quarry export and reclamation activity. Years with average annual quarry export and peak annual reclamation would experience an increase in annual barge trips compared to years with average reclamation import. • During periods of peak reclamation activity, the number of weekly barges using the site could increase from approximately two to four. • Because the <u>daily</u> number of barges entering and exiting the barge loading area is limited by tide and physical constraints, the maximum number of daily barge trips would not exceed existing conditions, and no significant change in marine transportation conditions would be anticipated. 	<ul style="list-style-type: none"> • During quarry operations, vehicular and marine traffic conditions would be similar to the <i>Proposed Action</i>. • Vehicular and marine traffic from the site would end approximately 18 years earlier than under the <i>Proposed Action</i>. 	<ul style="list-style-type: none"> • During quarry operations, vehicular and marine traffic conditions would be similar to the <i>Proposed Action</i>. • Vehicular and marine traffic from the site would end approximately 10 years earlier than under the <i>Proposed Action</i>.

1.4 MITIGATION MEASURES

Mitigation measures associated with the *Proposed Action* include the following:

Earth

Planned mitigation for the *Proposed Action* and Alternatives largely consists of site reclamation efforts to restore and stabilize areas disturbed during mining. Specific reclamation issues would be addressed as a revision to the Proponent's current Surface Mining Permit. As a key component, the overall reclamation strategy is intended to address requirements of the Surface Mining Act, Chapter 78.44 RCW, as amended 1993.

Landslides

The following measures are included as part of the proposal.

- No surface water features would be constructed above the bedrock slopes around the perimeter of the mine limits during mining or reclamation activities to avoid recharging potential planes of weakness in the rock slopes.
- During reclamation, the final bedrock slopes would be buttressed with imported fill material, and the risk of block failure in the bedrock would remain low. Additional mitigation measures could be implemented if necessary prior to placing the imported fill soils to reduce the risk of failure of the final bedrock slopes such as those outlined at the end of this section. The type of mitigation measure(s) required would depend on the site-specific conditions and would be determined at the time of mining.
- Reclaimed fill slopes would be placed at gradients no steeper than 3H:1V.
- The fill would be compacted following the earth embankment standards outlined in Washington State Department of Transportation's (WSDOT's) Standard Specifications (2000).

In addition to the mitigation measures included in the proposal, the following measures are recommended to further reduce the potential for landslide impacts.

- During reclamation, modifications to slope gradient and compaction effort may be necessary during fill placement to adjust for variations in grain size and moisture content of the fill material.
- Adequate drainage should be provided to facilitate the placement and compaction of fill soils. Water needing to be pumped from low areas of the mine would be directed to the stormwater conveyance and treatment systems. Storage ponds would not be constructed above the fill slopes to reduce the risk of recharging the fill soils and promoting slope instability.

Erosion

The following measures are included as part of the proposal.

- During mining, stormwater would be directed into a multi-cell pond system similar to the one currently being used at the site. All of the stormwater would be treated and discharged to Mats Mats Bay in accordance with the existing National Pollutant Discharge Elimination System (NPDES)/Stormwater Discharge Permit issued for the site. Sediment from the quarry area would be intercepted by these ponds, and the risk of off-site sediment transport hazards is considered low.
- The reclamation fill soils would be placed at relatively low gradients, and the risk of erosion is considered low. Stormwater runoff from the reclaimed pit would be directed into the proposed sediment pond to be constructed on the east side of the quarry area. This pond would release water into Admiralty Inlet via an energy dissipater. Localized surface water runoff near the northern edge of the site would be directed into small infiltration areas. Runoff from these areas would remain on-site, and no risk of off-site sediment transport has been identified.

In addition to the mitigation measures included in the proposal, the following measures are recommended to further reduce the potential for erosion impacts.

- Stormwater runoff from the bedrock mine area should not be directed to sloping areas or allowed to randomly discharge on the site. Stormwater or intercepted ground water seepages within the bedrock should discharge into riprapped drainage ditches that empty into the approved sedimentation ponds. Runoff from saturated fill soils should also be directed into properly constructed conveyance systems.
- To reduce the risk of surface water runoff on the fill slopes triggering erosion and sediment transport, it is recommended that the fill slopes be constructed with a bench every 25 vertical feet. The bench would reduce surface water runoff velocities and the risk of rill and channel erosion. The benches should be backsloped into the hillside. Runoff from the benches should be directed to the proposed sediment pond or the proposed stormwater depressions. Any runoff paths on slopes greater than 5H:1V should be lined with riprap and check dams constructed every 75 lineal feet.
- Source control mitigation measures for reclaimed fill slopes should include the proper placement of hydroseeding and straw mulch (tacked down). In addition, prior to revegetation of the fill soil, the slopes should be trackwalked (up and down) in order to roughen the ground surface and reduce runoff velocities.

Air Quality

- The operator of the Mats Mats Quarry (Glacier Northwest) currently implements measures to control fugitive dust emissions from the site. Because fugitive dust would generally continue as existing under the *Proposed Action*, current dust suppression measures would continue. The dust suppression measures are for the entire site but focus on the main emitters: vehicles traveling on unpaved surfaces. The site currently utilizes the following mitigation measures that are detailed in their OAPCA Order of Approval to Operate at Temporary Locations permit:
 - The facility's permanent roads and parking lots are paved and are cleaned daily to prevent track-out. This has been true since 1998.

- The yard and the parking area around the shop are graveled to allow the movement of heavy equipment. The graveled areas are regularly maintained and watered at short intervals to prevent fugitive dust emissions.
 - All but three of the facility's conveyors are adjustable to allow for varied drop heights. The three non-adjustable conveyors will be replaced in the near future with adjustable models.
 - Conveyor operation is curtailed during high wind events.
 - When necessary, the wheels and undercarriages of haul trucks are washed before they leave the site to prevent track-out.
 - The material stockpiles and truckloads are watered at short time intervals to maintain relatively high moisture contents and to reduce fugitive dust emissions.
 - Two water spray trucks are maintained on-site at all times to allow for operational flexibility. These trucks are used to distribute water wherever and whenever necessary to prevent fugitive dust emissions.
 - The speed limit at the facility, historically and currently, is 10 miles per hour. This slow speed helps to reduce fugitive dust emissions generated by vehicle traffic on paved and unpaved surfaces.
 - Employees are trained to handle powdered materials carefully to prevent the generation of dust.
 - Blasting is not performed when wind speed exceeds 25 mph in any direction, or 20 mph when the wind is blowing in a westerly direction toward nearby residences.
 - The water truck is used to wet down the blast area immediately prior to blasting if necessary to control dust.
- Additional mitigation measures that could be used at the site include: maintaining a high moisture content for stacked materials, and minimizing drop height onto piles.
 - Glacier Northwest would implement a complaint investigation and resolution plan to address air quality concerns from the community.

Surface Water

- Stormwater flowing from the site would continue to be discharged consistent with the terms of the Sand and Gravel General of the Department of Ecology (Permit WAG-50-1286). The Sand and Gravel General Permit establishes limits on quality of the water discharging the site.
- Any impacts related to accidental spills would be mitigated through implementation of the site Emergency Spill Response Plan. Spill kits are available in the shop and at the dock, and can be deployed anywhere on-site within minutes.

Groundwater

Marine Seepage

- Water seeping or flowing into the mine area would be collected, treated, and discharged using the existing and proposed mine water and stormwater conveyance and treatment systems. Both the mine water and stormwater collected at the site during mining would eventually be discharged to Mats Mats Bay.

- Permeable fractures, faults, and flow tops discharging marine water into the mine at a rate that impacts the ability of the proposed mine dewatering system to adequately convey and treat the mine water in accordance with the NPDES permit requirements would be pressure grouted.
- A capillary break would be constructed within the backfill material during mine reclamation to minimize capillary suction effects of the backfill. The capillary break would likely consist of a 1- to 2-foot-thick layer of coarse gravel or rock aggregate placed above the mine reclamation backfill over an interval corresponding to 0 to 1 foot above mean sea level. If needed, geotechnical fabric could be placed below and above the capillary break material to minimize the potential for fine particles to fill in the voids in the coarse aggregate, and thereby negating some of the effectiveness of the capillary break. The reclamation bond would include the coarse-grained material for the capillary break.

Off-Site Wells

Mitigation measures identified for minimizing the risk of potential impacts to ground water south of the site are listed below.

- A minimum 300-foot setback exists and would be maintained between the southern quarry limits and the southern property line to maintain the existing hydraulic barrier between the quarry and existing off-site wells to the south.
- A comprehensive Groundwater Monitoring Program would be implemented for the purpose of monitoring any long-term potential impacts to ground water flow south of the active mine limits during anticipated mining and reclamation activities. A copy of the proposed ground water monitoring plan is presented in Appendix IX to this Final EIS. Key elements of the ground water monitoring program include the following:
 - the drilling and installation of three new monitoring wells located south of the proposed mining limit and north of well EB-33;
 - downhole geophysics and video logging of the new monitoring well borings to identify the presence and depths of any flow tops, fractures, or faults capable of transmitting water at rates greater than the recharge rates estimated for EB-33;
 - installation of dedicated data logging equipment in each of the new monitoring wells and well EB-33 for continuous monitoring of water levels;
 - periodic sampling of the wells for specific conductance/salinity, chloride, nitrate, and total dissolved solids (TDS). The anticipated sampling schedule and review by DNR and Jefferson County is preliminarily identified in the Groundwater Monitoring Plan and would be ultimately determined through the approval process;
 - monthly data compilation, review, and analysis to identify any potential trends in the data which could indicate the potential for long-term impacts to ground water flow south of the mine resulting from the *Proposed Action* or the two alternatives (review and analysis of data would be conducted by the DNR, Jefferson County and Glacier Northwest); and,

- development of criteria for determining if mining or reclamation activities are adversely impacting well yields for the nearby domestic supply wells. Most of the ground water monitoring criteria used for determining whether additional mitigation measures need to be implemented will be identified after background monitoring has been completed.
- A Neighborhood Water Supply Policy, supplementing the Groundwater Monitoring Program (Program), would be implemented to provide water as quickly as possible to participating neighbors to the south of the quarry should the neighbors suspect that quarry operations have affected their wells. Implementation of the Neighborhood Water Supply Policy would be concurrent with the ability of Glacier Northwest to mine below the currently permitted level. Because the contingency and response process of the Program could take time, the Neighborhood Water Supply Policy would ensure that residents have water during the contingency planning and response process. A copy of the proposed Neighborhood Water Supply Policy is presented in *Appendix XIV* to this Final EIS.
- Ongoing visual monitoring of exposed bedrock surfaces would be completed by either the mine supervisor, the mine engineer, or a professional geologist on a periodic basis as active mining proceeds towards the southern portions of the site. The objectives of the visual monitoring program include: (1) identification of any rock physical characteristics, such as fracture zones or faults, that indicate the potential for increased ground water discharge to the mine from the south; and, (2) monitoring of ground water and marine water seepage locations and estimating approximate seepage rates into the active mine area.
- Fractures or faults observed to be discharging fresh ground water along the southern mine walls or mine floor at sustained rates of greater than about 10 gpm for more than three hours would be pressure grouted as fast as possible to minimize the potential for immediately impacting current yields for the nearby supply wells. Decisions regarding whether or not to pressure grout fractures or faults discharging ground water at sustained rates of less than about 10 gpm would be based on data obtained from the ground water monitoring wells to be installed along the southern mine limits. Pressure grouting would be completed in a manner that effectively seals any fractures or faults that are discharging fresh groundwater of 10 GPM or more. After a fracture or fault is pressure grouted and all available monitoring data has been analyzed, a revised mining operations plan would be developed to ensure that the existing hydraulic barrier between the quarry and the off-site supply wells continues to be maintained.

Plants and Animals

Plant and Animal Habitat

- Approximately 34 acres, or 29 percent of the site, would be retained in shoreline and upland buffer as either mature mixed forest or mature deciduous forest.
- The quarry area would be sequentially replanted (reclaimed) with Douglas-fir, grasses, forb, and shrub seed. Volunteer seed from the upslope buffer areas would provide additional tree, shrub and forb species.

- Mitigation measures would include enriching stabilizing seed mixes with native species that could tolerate dry sites. This measure would speed the inclusion of native plant species into the restoration communities. Placement of woody debris and large rocks would provide habitat elements that otherwise would be absent for decades.
- Under continued mining operations, mining would progress in a series of seven phases or stages. Each phase would mine an area of approximately 10 acres. Following extraction of rock, the mine area would be reclaimed within two years by: (a) backfilling with non-salable mined material from the Mats Mats quarry and/or clean soil imported from off-site locations, (b) grading the areas to conform to the Reclamation Plan contours, (c) top-dressing the areas with soils that would support native plant communities (placed at depths of two to six inches on future buildable portions of the site and six to twenty-four inches on future non-buildable areas), and (d) planting the area with grasses, shrubs, and trees. It is anticipated that the reclaimed areas would also receive a substantial contribution of volunteer seeds from adjacent plant communities and that diverse plant communities would develop.

Within 15 or 20 years of planting, it is anticipated that the quarry floor would become closed canopy mixed forest dominated by Douglas-fir and red alder but also including western red cedar, western hemlock, and big-leaf maple. The sloped area to the quarry floor will be drier, grow more slowly, and be dominated by Douglas-fir, alder, and madrone. A total of 82.5 acres would be reclaimed and would ultimately become mixed or deciduous forest. Twenty years following completion of the Reclamation Plan, the forests would be composed of 55.9 acres of mature forest and 60.1 acres of young closed canopy mixed forest.

- The Reclamation Plan includes approximately 1.0 acre of sedimentation pond and drainageways. These ponds and drainageways are not designed to be wetlands, but seasonal wetlands communities may develop.
- Mitigation would be directed towards protecting the shoreline and upland buffer habitats which are mature mixed and conifer forest. Where past activity has cleared any of these buffers, the cleared area could be dressed with suitable topsoil and replanted with Douglas-fir as soon as possible in order to initiate regrowth of the forest cover in the buffer. Existing clean large woody debris, consisting of approximately 150 tree stumps ten feet long and six to eight feet in diameter at breast height (dbh), could be placed in these areas prior to replanting in order to add this habitat element that would not otherwise be present for many years.
- Other mitigation measures would be directed toward small mammals, birds, reptiles, and amphibians that can be expected to persist in the area, given the continued mining activity. The relative magnitude of changes in wildlife communities will depend upon the retention of existing vegetation types and on management of vegetation during reclamation. Studies have shown that bird species numbers and diversity are directly related to the amount and kind of vegetation, in this case shrubs and trees, that are present. While seed sources for most of the native tree and shrub species will be present in the remaining buffers, some species of trees and shrubs may return more quickly if seeded or planted.
- A conceptual plant and wildlife mitigation plan would be developed to guide actions during subsequent reclamation of each of the phase cells. Specific restoration plans could be prepared for each mining phase.

Marine Habitat

- Barge loading and unloading operation procedures would be reviewed to control tail gate spillage, insure that barge side fences are high enough, and clean-off barge ends to insure a good seat for barge ramp aprons.
- All tugs and other potential sources of petroleum product spills would be equipped with emergency spill cleanup equipment. Heavy equipment operating near the water would be checked periodically and regularly for petroleum leaks and maintained to avoid any discharge.
- Barges importing soil would implement Best Management Practices to minimize the potential for spillage of soil thru barge fence openings into the water. Practices could include: temporary closures at unused ramp openings during unloading operations; temporary placement of flexible or rigid dikes at openings during unloading operations; and, unloading using normal careful and safe techniques that pull material away from fences during unloading operations.
- Surface water runoff from the area around the barge loading facility is and would continue to be captured and treated to avoid draining excessive fine sediment to the loading area impoundment.
- Implementation of air quality measures would further limit the potential for air borne dust impacts to water quality.

Noise

Glacier Northwest has incorporated a number of noise-reducing measures into its current operations, including adhering to the Jefferson County Unified Development Code (UDC) hour limitations for extraction and reclamation activities, the installation of mufflers to the Terex trucks and maintenance of product storage piles around the portable plant to buffer plant noise. These measures would noticeably reduce noise levels at surrounding properties and increase the margin of compliance with state noise limits.

Several additional measures would be implemented to further reduce noise impacts.

- Rock drilling noise would be well-below grade, where the pit walls would shield neighboring properties from noise from the drill and tracked shovel.
- Mobile equipment would be equipped with backup alarms designed to minimize off-site noise impacts. Several options are available and under consideration, including 1) strobe lights for non-daylight hours, 2) alarms that sense the loudness of the ambient environment and then produce a sound that is just loud enough to be heard over the background level, and 3) alarms equipped with a detector that senses the proximity of a person or object and only then sounds a backup alarm.
- Prior to full-time operation of the 42" Jaw (rock crusher), sound level measurements would be conducted to verify that the 42" Jaw sound level does not exceed that of the 36" Jaw. If the 42" Jaw sound level at the site boundary exceeds that of the 36" Jaw, measures to

reduce the sound level to that of the 36" Jaw would be implemented prior to full-time operation of the 42" Jaw. Measures could include construction of noise absorbing sound barrier attachments; lining and/or reconfiguration of drop points; and, changes in plant operations.

- Conduct additional noise monitoring after the types or locations of major pieces of equipment operating at the Mats Mats quarry are changed to verify that the change in equipment location would not result in an exceedence of Jefferson County noise standards.

Risk of Explosion and Vibration

General

- Blasting would adhere to all state and federal blasting regulations.
- Before the blaster in charge would start loading any shot for blasting, he/she would first review the proposed blast with either the superintendent or another licensed blaster. The following items would be reviewed: the pattern (i.e., burden and spacing); the intended objective of the blast, rip rap or crusher run; the powder factor needed to achieve the objective; the timing of the delays to minimize vibration; the sequence in which the shot will be loaded; the set up of the seismograph between the blast and the nearest residence; and, the set up of the video camera to record the blast.
- Before loading any lifter shot, the blaster in charge would review the following items with the superintendent or another licensed blaster: the drill log would be reviewed to determine the amount of overburden on the back side of the proposed shot; and, determine whether a blast mat is required to negate all possibility of fly rock.
- The superintendent, the blaster in charge, and/or another licensed blaster would review every shot. Their notes and observations would be attached to the blast report.

Vibration

- All blasting will continue to be accomplished in daylight hours. A list of residents wishing to be contacted prior to commencement of any blasting will be kept on site.
- The blasting plan will limit blasting vibration to a level (peak particle velocity 1 in/sec at the site boundary using a scaled distance of 30) that has a near zero probability of structural damage to occur to residences constructed according to Uniform Building Code (UBC).
- To verify the level of blasting-related ground vibrations, ground vibration monitoring will be conducted consistent with US Office of Surface Mines Method 2 standards. If vibration levels beyond acceptable standards are detected, the blasting techniques will be refined to ensure compliance.

Flyrock

- Minimum stemming (depth of hole) would be maintained at 0.7 times burden or 8 feet, whichever is greater, to minimize flyrock.

- Blasts would be designed for: proper hole spacing and burden, proper powder factor, proper delay timing and sequencing, and minimum number of holes.
- When used, to the extent practicable, lifters would be oriented so that they do not point, or are oriented towards off-site structures.
- When applicable, blasting mats would be used to minimize the potential for flyrock.
- Sand-bagging or otherwise confining loaded lifters to further minimize flyrock.
- Care would be taken when preparing borings so that future bench blasts are not undercut to reduce underburdening at the toe and the potential for flyrock.

Land Use – Land Use Patterns

- A 200-foot wide naturally vegetated buffer would be retained around the shoreline perimeter of the site and a 300-foot wide buffer would be retained between the southern site boundary and the quarry to buffer vicinity residential uses and views from the mining activity.
- All outdoor and security lights would be shielded with top clad plates and would be focused downward to avoid glare onto surrounding areas.
- Mitigation measures related to impacts from noise, air quality and transportation conditions are identified in the *Noise, Air and Transportation* sections respectively.

Transportation

- Because continued mining operation would not increase truck traffic, car traffic, or maximum daily barge traffic, and no vehicular or barge traffic safety hazards have been identified, no mitigation is proposed or required.

1.5 UNAVOIDABLE ADVERSE IMPACTS

Earth

None are anticipated.

Air Quality

In spite of the implementation of best available control technologies, aggregate mining and reclamation operations would continue to cause some air pollutant emissions incrementally at the project site and along the haul route from the facility. The primary emissions at the site would be fugitive dust that would increase ambient particulate levels in the area. Emissions of diesel exhaust would result from the truck traffic. However, controlling emissions from the haul road and applying reasonably available controls at the plant would prevent air pollutant

concentrations from exceeding the applicable standards and significant impacts would not be anticipated.

Water

None are anticipated.

Plants and Animals

No significant impacts have been identified.

Noise

With implementation of the proposed mitigation measures no unavoidable adverse impacts are anticipated.

Risk of Explosion and Vibration

None are anticipated.

Land Use – Land Use Patterns

Land use impacts related to mining activity would be extended by approximately 18 years.

Transportation

None are anticipated.